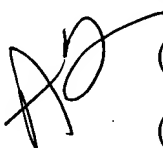


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12. (Amended) A riveting electrical control system comprising:

(a) an electrical control unit;

(b) an electric motor connected to the electrical control unit;

 (c) a transmission operably driven by energization of the electric motor;

(d) a riveting punch operably advanced by the transmission; and


(e) a sensor connected to the electrical control unit, the sensor being

operable to sense riveting force.

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17. (Amended) The system of Claim 18 wherein the characteristic changes at least in part due to varying rivet setting performance.

18. (Amended) The system of Claim 12 further comprising a second sensor operably sensing an electrical power characteristic of the electric motor.

 19. (Amended) The system of Claim 12 further comprising a second sensor operably sensing a speed of the electric motor.

20. (Amended) The system of Claim 12 further comprising a second sensor operably sensing a torque of the electric motor.

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22. (Amended) A riveting electrical control system comprising:

- (a) an electrical control unit;
- (b) an electric motor connected to the electrical control unit;
- (c) a transmission operably driven by energization of the electric motor,

the transmission operably converting rotational movement of the electric motor to substantially linear movement;

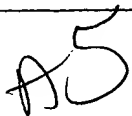
(d) a riveting punch operably advanced in a substantially linear direction by the transmission;

 (e) a self-piercing rivet operably driven by the punch as controlled by the electrical control unit; and

(f) a die operably diverging an end of the rivet without the rivet piercing completely through the exterior surface of a die-side workpiece adjacent the die;

the electric control unit operably controlling energization of the electric motor and operably determining if an undesired riveting condition is present.

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 30. (Amended) The system of Claim 22 wherein the electronic control unit automatically operably causes varying sized self piercing rivets to be operably driven by the punch.

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34. (Amended) A control system comprising:

- (a) a programmable control unit;
- (b) a riveting machine including an electric motor and a transmission

operable to convert rotary motion of the electric motor to linear motion of a punch;

(c) a self piercing rivet operably set by the punch acting with a substantially relatively stationary die of the riveting machine when the control unit causes energization of the electric motor; and

(d) a feeder operable to transfer the rivet to the riveting machine.

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42. (Amended) The system of Claim 34 wherein the electrical control unit determines if a riveting characteristic is within a desired range, the rivet being of a hollow and diverging type with a solid head.

43. (Amended) A control system comprising:

(a) a programmable controller;

(b) a riveting machine including an electric motor and a transmission, the transmission being operable to convert rotary motion of the electric motor to substantially linear motion;

(c) a rivet operably moved by the riveting machine when the controller causes energization of the electric motor, the rivet being of a hollow and diverging type with a solid head; and

(d) a sensor operable to indicate power consumption of the electric motor, the controller operably receiving a signal generated by the sensor.

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48. (Amended) A control system comprising:

(a) a programmable controller;

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(b) a riveting machine including an electric motor and a transmission, the transmission being operable to convert rotary motion of the electric motor to linear motor, a section of the electric motor being rotatable about an axis offset from a centerline coaxial with an elongated dimension of the punch;

(c) a rivet operably moved by the riveting machine when the controller causes energization of the electric motor;

(d) a sensor operable to indicate a riveting force characteristic, the controller operably receiving a signal generated by the sensor;

(e) an articulating robot, the riveting machine being attached to and positioned by the robot; and

(f) a rivet feeder connected to the riveting machine, the controller operably controlling actuation of the rivet feeder.

49. (Amended) The system of Claim 48 wherein the controller compares the signal generated by the sensor to previously stored data, and the rivet having a solid head and a diverging open end which does not completely penetrate a workpiece farthest from the head.

50. (Amended) A riveting electrical control system comprising:

(a) an electrical control unit;

(b) an electric motor connected to the electrical control unit;

(c) a mechanical transmission operably converting rotational movement of the electric motor to substantially linear movement; and

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(d) a rivet setting punch operably advanced by the transmission;

(e) the electrical control unit operably determining if a riveted joint is within a desired range.

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53. (Amended) The system of Claim 50 wherein the electrical control unit includes a programmable microprocessor which compares sensed data to other data, and the electrical control unit continuously compares actual workpiece thickness signals to previously stored workpiece thickness signals substantially during rivet setting.

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